

### Claims

1. An injection device having a propulsion system comprising a container, a re-usable pressure generating mechanism and a primary source of potential energy for propelling a fluid with sufficient pressure through an orifice to create a jet enabling subcutaneous or intracutaneous delivery of the fluid, the source of potential energy primarily in the form of a compressible substance that is put under pressure within the container by the pressure generating mechanism, whereby said potential energy is substantially compression energy of said substance, wherein said substance is a liquid, solid, or other non-gaseous substance as defined at ambient temperature and pressure.
2. Device according to claim 1, wherein the compressible substance has a volumetric compressibility ( $dV/V$ ) at said pressure within the container greater than 1.2 times the volumetric compressibility of water.
3. Device according to any one of the preceding claims, wherein the compressible substance is a visco-elastic liquid or soft matter.
4. Device according to the preceding claim, wherein the compressible substance belongs to the family of polysiloxanes.
5. Device according to claim 1 or 2, wherein the compressible substance is an elastic solid.
6. Device according to the preceding claim, wherein the solid is vulcanised silicon rubber.
7. Device according to any one of the preceding claims, wherein the volume of compressible substance is reduced by displacing a piston of the pressure generating mechanism.

8. Device according to any one of claims 1-4 or 7, further comprising a separating wall in the container enclosing the compressible substance in a rear chamber of the container, the separating wall comprising a valve that can be  
5 opened to enable the compressible substance to flow into a front chamber and transmit pressure to said fluid to be injected.

9. Device according to any one of claims 1-7, wherein the liquid to be injected is received in a single-use capsule or ampoule insertable into the container of the  
10 propulsion system which forms a unit.

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10. Device according to claim 9, wherein the compressible substance is permanently mounted in the container.

15 11. Device according to claim 9, wherein the compressible substance is mounted in the capsule.

12. Device according to anyone of claims 9-11, wherein said container comprises a separable portion, such as a cap, to open the container portion and  
20 enable the ampoule or capsule to be mounted therein.

13. Device according to any one of the preceding claims, further comprising retaining means comprising a plug for maintaining the pressure of the compressible substance in the container prior to use by closing an orifice or a  
25 passage.

14. Device according to claim 13, wherein the plug is a mechanical plug that may be displaced to liberate said passage or orifice.

15. Device according to claim 9, wherein the ampoule comprises a flexible or deformable wall fixed to the nozzle portion to contain the fluid to be injected therein.
- 5 16. Device according to the preceding claim, wherein a plug is arranged in the nozzle portion.
17. Device according to claim 16, wherein the plug is made of high tensile strength wire.
- 10 18. Device according to any one of claims 1-7, further comprising a liquid supply system having a liquid supply reservoir interconnectable with the propulsion system.
- 15 19. Device according to the preceding claim wherein the liquid supply reservoir is interconnectable with the propulsion system through a valve controlling the blocking and opening of the nozzle orifice.
- 20 20. Device according to the preceding claim wherein the valve comprises a cylindrical portion comprising a first passage therein for interconnecting the liquid supply container with the propulsion system in a refilling position of the valve, and a second passage for interconnecting the propulsion system with the nozzle orifice in an actuated position of the valve.
- 25 21. Device according to claim 18, 19 or 20 wherein the liquid supply system comprises a feed mechanism for dosing the supply of liquid, the feed mechanism and the pressure generating mechanism being driven by motors controlled by an electronic control system.

22. Device according to any one of the preceding claims wherein the propulsion system comprises a secondary source of potential energy generating a lower pressure than the primary source of potential energy.

5 23. Device according to the preceding claim wherein the secondary source of potential energy comprises a spring.

24. Device according to the claim 22 wherein the secondary source of potential energy comprises a gas in the propulsion system container.

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25. Device according to the claim 22 wherein the secondary source of potential energy comprises a pair of opposed magnets.